Stockton, May 7th 1879.

Messrs Geo. F. Smith, C. C. Castle, H. Barnhart / Trustees of Reclamation District No 221

Gentlemen —

In accordance with your request of March 29th 1879, I have made a survey of Swamp Land District No 221 and herewith submit for your approval a map with plans and specifications showing location, and Estimate of the cost of the work necessary for the reclamation of the District, together with estimated incidental expenses of superintendence &c &c.

I have for convenience divided the proposed levee into five divisions, as the varied nature of the land and material at hand required in the construction of the levee, differ along the line of the proposed embankment.

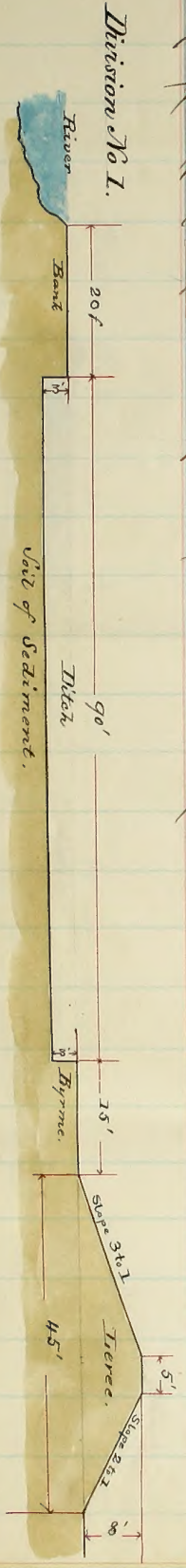
Your Engineer recommends that the following General plans be the basis of your operations in the work

Division No 1.

Commencing on N. Barnharts tract near the bridge over the Calaveras River on Lower Sacramento Road, thence following the line designated on the map ¼ mile to a point near N. Barnharts house — a levee averaging 2½ ft. high with a crown of 5 ft and slope on outside of 3 to 1 and slope on inside of 2 to 1 with an average base of 17½ ft containing 1604 cubic yds this estimate of material is made with an allowance of 1/6 of the entire cubical contents for shrinkage —

thence following the line as shown along the Calaveras and San Joaquin Rivers across the old dam in Ten Mile Slough and thence connecting with the old dam in 12 mile slough, a distance of 5 5/8 miles — a levee averaging 8 ft high with a crown of 5 feet and slope on outside of 3 to 1 and slope on inside of 2 to 1 with an average base of 45 ft. containing 343087 cubic yards — this Estimate of material is made with an allowance of 1/6 of the entire cubical contents of the levee for shrinkage

Below is a plan with dimensions, showing relative position of river, bank, the ditch formed by the excavation of the material in the levee, the byrme and the levee. In this and in all other plans given in this report, the minimum width of the bank between the river and ditch is given—



Division No 2.

Commencing at the termination of the levee in Division No 1 at 12 mile Slough thence following the line as shown along the San Joaquin River to old dam on 14 Mile Slough a distance of 1¼ miles a levee averaging 8 ft high and tung where it connects the dam on 12 mile Sl. 12 ft wide on top or crown and where it connects with dam on 14 mile Slough 18 ft on crown making an average on its entire length of 15 ft on crown— having a slope on both inside and outside of ½ to 1 giving an average base of 23 ft containing 49379 cubic yards. This Estimate of material is made with an allowance for shrinkage of ⅓ of the entire cubical contents of the levee. On next page is plan and dimensions of average levee referred to

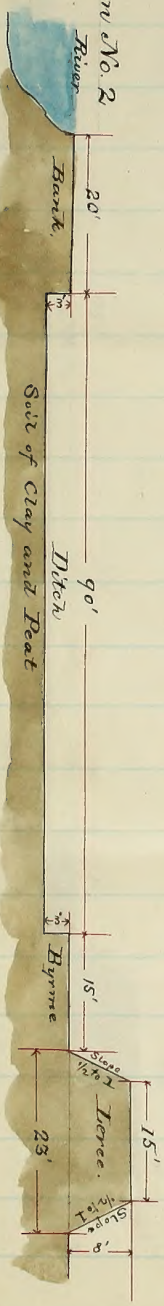
in this division

Division No 3

Commencing at the termination of the levee in Division No 2 at dam on 14 Mile Slough thence following the line shown along the San Joaquin River and up 21 mile Slough to the Section line common to Sections 11 & 14 in T 2 N. R. 5 E. thence East to Section line common to Sections 13 & 14 in same Township, a distance of $7\frac{22}{100}$ miles.- a levee averaging 8 ft high with a crown of 24 ft and slopes of 1/2 to 1 on both sides giving an average base of 32 ft, containing 474402 cubic yards. This estimate of material is made with an allowance for shrinkage of 1/2 of entire cubical contents of Levee. On next page is plan of average levee referred to in this division

Division No 4.

Commencing at the termination of the levee in Division No 3 & following the line shown to 1/4 section line of Section 18 T 2 N. R 5 E a distance of 1 1/2 miles A Levee averaging 5 1/2 ft high and where it connects with the levee in Division No 3 24 ft wide on crown



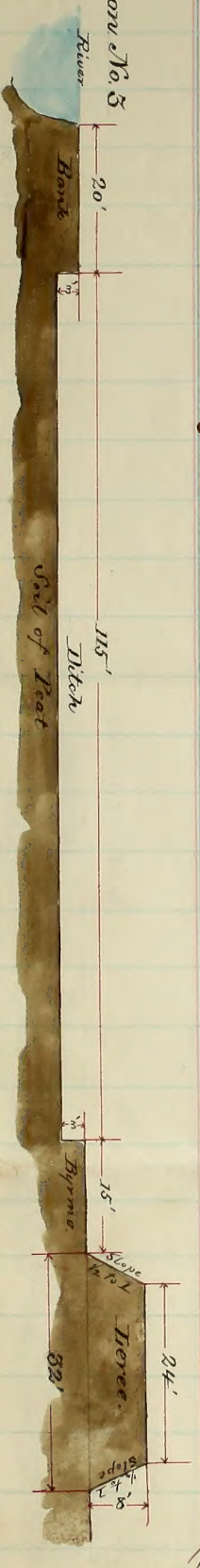
and where it terminates 12 ft on crown giving an average of 18 ft on crown, with slopes of ½ to 1 on both sides, giving an average base of 23½ ft containing 45006 cubic yards. This estimate of material is made with an allowance for shrinkage of ⅓ of the entire cubical contents of the levee. On next page is plan and dimensions of average levee &c referred to in this Division.

Division No 5.

Commencing at the termination of levee in Division No 4 thence East following line shown a distance of 1 3/32 miles a levee averaging 3 ft high with crown of 5 ft. and slope on outside of 3 to 1 and slope on inside of 2 to 1 giving an average base of 20 ft. containing 9604 cubic yards This Estimate of material is made with an allowance for shrinkage of ⅙ of the entire cubical contents Of the levee—

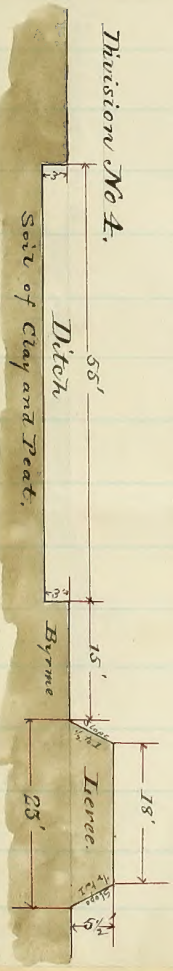
This division terminates the line of levee.

On second page following is plan & dimensions of average levee in this division



The levees here described are in length 16 93/100 miles and contain in the aggregate 923082 cubic yards—

In addition to this levee work proper, three small dams will have to be built, one near the head of 21 mile slough and in Each of the two small sloughs running out of 21 mile slough as shown on map— Each of these sloughs will require a 10 ft. flood gate. The dams in 10 and 14 mile sloughs will require additional earth work to strengthen and make them generally conform to the new work. All of the flood gates now built will require repairs and some alterations. It is recommended that they be increased in height by topping out 2 ft and that sheet piling be driven at both ends of all of them.



Estimate of Cost.

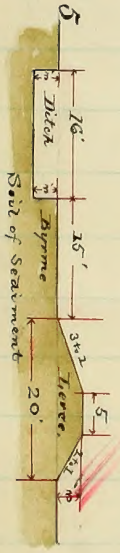
Levee Work proper 923082 cu yds @ 9¢	$ 83.078.28
3 New Flood Gates @ $350.	1050.00
Repairs and sheet piling on 11 Gates @ $100. each	1100.00
Additional earth work to old dams	1500.00
3 small new dams @ $250.	750.00
Wheeling Planks & sundry tools and Equipments other than shovels and wheelbarrows	1200.00
	$ 88.678.28
Incidentals & Contingencies including Engineers, Superintendents and their maintenance 12½ % of above amt	11.084.78
Total	$ 99.763.06

I remain Gentlemen
Your Obt Servant
C. D. Rhodes, C. E.

The above report accepted and approved by Trustees of Reclamation District No 321 — May 7th. 1879

Geo F Smith
C. C. Castle Pres.
H Barnhart

Division No. 5



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